

**Obstructive Urolithiasis in Buffalo Calves and Goats: Incidence and Management**

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Abstract

The present study was conducted to acquire detailed information regarding the cases of retention of urine in goats and buffalo calves presented to the Division of Surgery, Referral Veterinary Polyclinic, IVRI-Izatnagar over a period of 8 months. Out of 186 animals presented with the complaint of retention of urine, 82 (44.08 %) were goats and 104 (55.91 %) buffalo calves. A thorough history regarding age, sex, location, feeding, retention type-partial/complete, castration and duration of retention, of all cases was taken. Age of the animals ranged between one and nine months, with young ones being more commonly affected. Gender variations were seen wherein males were mostly affected. More prevalence was found in the extreme summer or winter. Goats castrated at early age were more affected while such observations were not seen in buffalo calves. Cystorhexis was more common in buffalo calves compared to goats. All the animals were treated on the same day, taken as surgical emergency and tube cystostomy was done. In post-operative period urinary acidifiers were given to dissolve the calculi. Catheter was removed on an average at 13-17 days post surgery after the animals started passing urine normally through the natural orifice, though, in some cases delay in normal urination was observed.

Keywords: Buffalo calves; Goats; Tube cystostomy; Urolithiasis

Introduction

Urolithiasis is the disease of prime importance in domestic animals all over the world and is of multifactorial origin. Factors like diet, age, sex, breed, genetic makeup, season, soil, water, hormone levels, mineral, infection, etc. play a role in the genesis of urolithiasis (Udall and Chow, 1969). Once the calculi are formed in urinary tract, they may be lodged in any part of the urinary tract, thus leading to the retention of urine. Management of urolithiasis is a difficult proposition with surgery being the primary treatment of obstructive urolithiasis (Larson, 1996; Van Metre *et al.*, 1996). There are number of surgical procedures available viz., Urethrostomy (Stone *et al.*, 1997), bladder marsupialisation (May *et al.*, 1998), tube cystostomy (Williams and White, 1991), penile catheterization

(Winter *et al.*, 1987) and penile amputation (Winter *et al.*, 1987), though each with some limitations. However, tube cystostomy together with medical dissolution of calculi is an effective technique for resolution of obstructive urolithiasis in small ruminants (Ewoldt *et al.*, 2006). Animals are often presented in different situations and duration of obstructive urolithiasis and those with prolonged obstruction are always poor surgical risk patients due to the ensuing uraemia. Surgical and anaesthetic management of these animals is therefore a challenging task and need to be done cautiously.

Materials and methods

The present study was conducted at the Division of Surgery, Referral Veterinary Polyclinic, IVRI-Izatnagar. A total of 186 animals brought with the complaint of retention of urine were treated by tube cystostomy. These cases were brought from Bareilly and its surrounding areas. Anamnesis (in-

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volving information about the age, sex, location, feeding, retention type-partial/complete, castration, duration of retention, treatment given and season) of all the cases was taken. A thorough clinical examination was done to check the condition of animals. Physical examination was done to check the status of the urethra and urinary bladder. In addition, rupture in bladder was also checked by abdominocentesis. All the animals affected were treated surgically on the same day.

Anaesthetic protocol

The surgical procedure adopted for the treatment of urolithiasis in buffalo calves was tube cystostomy. Anaesthesia: The anaesthetic protocol used was local infiltration and regional anaesthesia (Lumbosacral epidural) with 2% lignocaine hydrochloride. Dexamethasone (4-8 mg) along with drip (normal saline, 0.5-2.0 Lt depending upon the condition of animal) was administered in the cases that appeared to be poor surgical risk patients.

Surgical procedure

Surgery was performed in right lateral recumbency. Animals were shaved at an area lateral to the penis on the left side of the abdomen near the rudimentary teat. After proper scrubbing of the surgical area, incision was given anterior to the rudimentary teat. After incising the skin, fascia, muscles and the peritoneum, bladder was located. After locating the intact bladder, a subcutaneous tunnel was made through which the Foleys catheter was passed with pointed end towards the incision. Then the tube was held with the stilette and pierced into the bladder at an avascular area. The bulb of the tube was filled with the sterile water so as to fix the tube in the bladder. After successfully lodging the catheter into the bladder, the peritoneum, muscles and skin was closed routinely. In case of ruptured bladder, cystorraphy was done first followed by catheter placement. Cystorraphy was done with the catgut no. 1. In cases of urinary bladder rupture, urine drainage was done very slowly so as to prevent the animal from shock. This was followed by cystorraphy and finally by catheter placement.

Postoperative management

Owners were advised to give antibiotics (amoxi-

cillin and cloxacillin combination-Megapen at 500mg total dose in buffalo calves and 250 total dose in goats, IM) for 5 days, pain killers (Meloxicam-M-Cam at 0.5 mg/Kg body weight, per Os for 3 days) and ammonium chloride at 100 mg/Kg body weight, BID daily, per Os for 30 days. Local antiseptic dressing with povidone iodine (betadine) was advised for a week. 9.67 % animals (both goats and buffalo calves) were reported to have blocked catheter and 12.50 % (buffalo calves) had a complication of urethral rupture. Blocked catheter was cleared by flushing normal saline into the catheter. 15.05 % animals were found to have pus at the time of removal of the catheter which was cleared and then antiseptic dressing was done. In majority of the animals the catheter was removed at an average period of 13-17 days, though in some cases (especially buffalo calves, 12.5 %), catheter was removed almost after a month due to delayed normal urination. Majority of the cases showed uneventful recovery, though, in some cases urethral rupture was observed.

Results

Out of 186 animals affected with urolithiasis for the period of 8 months, 44.08 % (82) were goats and 55.91 % (104) were buffalo calves. Follow up of a total of 85.50 % cases was made while the rest of the cases (buffalo calves, 16.34 %; goats, 12.19 %) were not reported, post surgery. Cases were more prevalent in the extreme summer and winter. All those affected animals were young ones. In goats 89.02 % were between the age group of 1-4 months and rest 10.08 % were more than 4 months of age. In case of buffalo calves 84.61 % affected calves were of the age of 4-7 months and the remaining 15.39 % animals were above 7 months of age. Duration of retention was less than 3 days for about 93.90 % of goats. In buffalo calves 65.38 % were reported during first 3 days of retention. Cystorrhesis was observed in 17.31 % of buffalo calves and 6.09 % in case of goats. Urethral rupture was observed only in buffalo calves (6.73 %). 95.21 % of goats had a history of castration at the time of obstruction while in buffalo calves only 2.88 % were castrated. Feeding schedule in most of the animals was concentrate diet in addition to the milk. Also wheat straw and wheat bran (choker-available as readymade feed in the local market) remained the part of diet. Dribbling of urine was

observed in 8.65 % of buffalo calves and 12.19 % in goats, indicating partial obstruction. Males were exclusively affected in case of both buffalo calves and goats.

Discussion

Incidence of urethral obstruction in animals has been reported to be 5.04 percent in India. The species wise incidence reported is: goats 49.83 %, cattle 32.87 %, dogs 14.53 %, horses 1.38 %, sheep 1.04 % and cats 0.34 % (Amarpal *et al.*, 2004). In case of buffaloes, hospital incidence has been reported 12.66 % (Singh *et al.*, 2008). However, in the present study much higher incidence was seen in case of buffalo calves compared to goats. This species wise difference in the occurrence of urolithiasis may arise as a result of the factors like particular species population in the area, purpose for which animal is kept and management practices in vogue. Also the period for which buffalo calves are being maintained is much larger compared to goats. Season had a significant effect upon the occurrence of urolithiasis. Occurrence of urolithiasis in feedlot animals in peak winter may be due to the decreased water intake and deficiency of vitamin-A arising from lesser availability of green fodder (Radostitis *et al.*, 2000). Vitamin A is required for the maintenance of epithelial linings and also balances the vitamin D concentration. Excess sunlight and vitamin D may play an important role in urolithiasis in summer. Age related occurrence revealed younger animals to be affected more than adults. Diet given (concentrate) and the changes brought about by weaning may be contributing factors for more prevalence of obstructive urolithiasis in young ruminants (Radostitis *et al.*, 2000). Early reporting of goats for urinary retention than buffalo calves could be due to the vocalization shown by goats even with slightest of discomfort (lesser threshold for pain) and also due to the delayed discomfort shown by buffalo calves and their difficult transportation. Delayed reporting in buffalo calves could also be related with the higher occurrence of cystorrhesis than in goats. The other causes for rupture are Lasix (diuretic) treatment prescribed by the local vet leading to more urine formation (Adams, 1995). Due to the continuous formation of urine and its accumulation in urinary bladder subsequent to urethral obstruction, distension occurs. The increasing pressure and distended stretching of blad-

der wall results in inflammation, pressure ischaemia, devitalization, thinning, trabeculae formation and herniation of mucosa through the musculature of the urinary bladder leading to seepage or voiding of whole of the stagnated urine into the peritoneal cavity resulting in uroperitoneum (Makhdoomi and Ghazi, 2013). Higher percentage of complete urethral obstruction could be attributed to the presence of large number of sandy calculi in young animals which may fill the urethra leading to complete obstruction. Complete urethral obstruction also predisposes younger animals to its rupture (Singh *et al.*, 2008). Castrated male goats were more affected with urolithiasis. It is believed that castration at an early age could deprive the animal from testosterone required for the normal development of urethra (Belknap and Pugh, 2002). The absence of testosterone also decreases the protective hydrophilic colloids in the urine, thus increasing the incidence of urolithiasis (Smith and Sherman 1994; Rakestraw *et al.*, 1995). However, such correlation of castration with the incidence of urolithiasis was not found in buffalo calves. Urolithiasis was seen predominantly in males in both goats and buffalo calves. Though it occurs in both the sexes however, its more occurrences in males might arise due to the smaller diameter and more length of urethra (Hesse and Bruhl, 1990; Thilagar *et al.*, 1996). High phosphorous and lower calcium levels of commonly used concentrate rations might predispose the animal to phosphate uroliths (Funaba *et al.*, 2001; Amarpal *et al.*, 2004). Objectives of rapid growth rate and easy availability in cities generally encourage the owners to feed more concentrate ration to goats and calves. It was inferred that feeding had more significant effect on urolith formation than castration, especially buffalo calves.

The treatment of obstructive urolithiasis is primarily surgical (Larson, 1996; Van Metre *et al.*, 1996). Before surgical procedure, it is must to stabilise the animal as metabolic derangements like hyperkalemia, hyponatremia and hypocalcemia exists (Makhdoomi and Ghazi, 2013). This is generally been done by giving fluid through intravenous route. As a thumb rule, in ruminants there occurs metabolic alkalosis when urinary retention occurs. Normal saline in such cases is best to stabilise the animal. There are number of surgical techniques available, however, recurrent urolithiasis, calculi at multiple sites, badly damaged urethra, atonic blad-

der or severe cystitis leads to failure of surgical repair in obstructive urolithiasis (Dubey *et al.*, 2006). Tube cystostomy provides an alternative to number of the surgical techniques available for management of urolithiasis. Urethrostomy and urethrotomy, which can be post scrotal or post-ischial depending on calculi lodgement, has been used to relieve the obstruction. However, postoperative leakage of urine from the site of obstruction leads to necrosis of urethra and subcutaneous tissues. Further, postoperative urethral constriction, loss in breeding potential and recurrent urolithiasis is potential factors that results in the unfavourable outcome after urethrotomy (Türk *et al.*, 2012; Haven *et al.*, 1993). Problems reported with bladder marsupialization include extensive urine scalding problems, stoma stricture, and bladder prolapse through the fistula site (May *et al.*, 1998). Tube cystostomy gives passage for the removal of urine and prevents the accumulation which might lead to the rupture of bladder or the urethra (Dubey *et al.*, 2006). During this period, medical dissolution of the calculi is achieved by either acidifying the urine or by giving calculolytic drugs. The average duration of removal of catheter was about 13-17 days, though in some cases catheter was removed after a gap of one month post surgery. In previous reports, 14 days of hospitalization has been reported in goats (Ewoldt *et al.*, 2006). Ignorance on part of the owners in providing medicines (calculolytic drugs), differences in calculi composition and site of lodgement, might be the possible reasons for such differences. The problem of the urethral rupture observed in the present study might have resulted from blockade of the Foleys catheter, leading to increased pressure at the obstructed part. This problem can be solved by regular flushing of the catheter with the distilled water in order to prevent the blockade. The advantages of tube cystostomy are, improved potential for preservation of breeding function of the animal and urinary continence, and the opportunity for removal of cystic calculi (May *et al.*, 1998). In addition to surgical management, it is also important to impress upon the owner regarding the importance of water consumption by the animal and restriction of salt in the diet.

Conclusion

Obstructive urolithiasis is a common problem in the region, multifactorial in origin and need surgi-

cal as well as medical management for better results.

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